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Listing of Claims

1	1. (Currently Amended) A processor implemented data processing method
2	comprising:
3	identifying a first plurality of regions within a first recursively
4	partitioned/nested geometric structure that correspond to a first plurality of
5	normalized multi-dimensional data of a first normalized multi-dimensional data
6	space, the first recursively partitioned/nested geometric structure being
7	corresponding to the first normalized multi-dimensional data space;
8	determining corresponding first graphing values for said first corresponding
9	regions within said first recursively partitioned/nested geometric structure
0	determined for said first normalized multi-dimensional data of said first normalized
11	multi-dimensional data space;
12	associating corresponding first visual attributes with said first corresponding
13	regions within said first recursively partitioned/nested geometric structure, based at
14	least in part on corresponding ones of said determined first graphing values; and
15	displaying said first recursively partitioned/nested geometric structure, visually
16	differentiating said first corresponding regions based at least in part on
17	со́гтеsponding ones of said associated first visual attributes;
18	wherein said associating comprises for each of said first regions, associating
19	a selected one of a plurality of colored geometric primitives with the region based at
20	least in part on the determined graphing value of the region.

2 (Original) The method of claim 1, wherein each of said first normalized multidimensional data of said first normalized multi-dimensional data space comprises a plurality of relative coordinate values, and the method further comprises constructing a polynary string to represent each of said first normalized multi-dimensional data

- 5 and its corresponding one of said first regions within said first recursively
- 6 partitioned/nested geometric structure in accordance with the relative coordinate
- 7 values.
- 1 3. (Original) The method of claim 2, wherein said constructing of a polynary
- 2 string to represent each of said first normalized multi-dimensional data and its
- 3 corresponding one of said first regions within said first recursively partitioned/nested
- 4 geometric structure in accordance with the relative coordinate values comprises
- 5 selecting a symbol as the next symbolic member of the polynary string based on
- 6 which of the relative coordinate values is the current highest relative coordinate
- 7 value.
- 1 4. (Original) The method of claim 3, wherein said constructing of a polynary
- 2 string to represent each of said first normalized multi-dimensional data and its
- 3 corresponding one of said first regions within said first recursively partitioned/nested
- 4 geometric structure in accordance with the relative coordinate values further
- 5 comprises reducing the highest relative coordinate value in by an amount (G), upon
- 6 each selection, and reducing the amount (G) after each reduction.
- 1 5: (Original) The method of claim 4, wherein the amount (G) initially equals 1 --
- 2 F_{i}^{i} and thereafter reduced each time by $G^{*}(1 F)$, where F equals (n 1)/n, and n
- 3 equals the number of relative coordinate values.
- 1 6. (Original) The method of claim 2, wherein said determining of corresponding
- 2 first graphic values comprises determining frequencies of occurrence of the various
- 3 polynary strings of said first normalized multi-dimensional data, and assigning the
- 4 determined frequencies of occurrence to the corresponding first regions within the

- first recursively partitioned/nested geometric structure as the determined first 5
- graphing values of the corresponding first regions. 6
- (Original) The method of claim 1, wherein said determining of corresponding 1 7.
- first graphic values comprises assigning first output values corresponding to the first 2
- normalized multi-dimensional data as the determined first graphing values of the 3
- corresponding first regions within the first recursively partitioned/nested geometric 4
- 5 structure.
- (Original) The method of claim 7, wherein said determining of corresponding 8. 1
- first graphic values further comprises computing said first output values. 2
- (Original) The method of claim 8, wherein each of said first normalized multi-1 9.
- dimensional data of said first normalized multi-dimensional data space comprises a 2
- polynary string having a plurality of symbols, encoding a plurality of relative 3
- coordinate values, and said computing of the first output values comprises 4
- for each constituting symbols of a polynary string, summing one or more 5
- appearance values corresponding to one or more appearances of the particular 6
- symbol in the polynary string, and adding the sum to an average residual relative 7
- 8 coordinate value.
- (Original) The method of claim 9, wherein each appearance value 1 10.
- corresponding to an appearance of a particular symbol is dependent on the position 2
- of the particular appearance of the particular symbol in the polynary string. 3

- 1 11. (Original) The method of claim 10, wherein each appearance value
- 2 corresponding to an appearance of a particular symbol is equal to a positional value
- 3 associated with the position of the particular appearance in the polynary string.
- 1 12. (Original) The method of claim 11, wherein
- each positional value equals to $(1 F) \times F^{**}(k 1)$, and
- 3 the average residual relative coordinate value equals $(1 F) \times F^{**}K$,
- 4 where F equals (n 1)/n,
- 5 k denotes a position in a polynary string,
- 6 n equals the number of relative coordinate values, and
- 7 K equals the length of the polynary string.
- 1 13. (Original) The method of claim 2, wherein the method further comprises
- 2 receiving a first zooming specification comprising one or more of said
- 3 polynary string constituting symbols;
- 4 excluding a first subset of said first regions based at least in part on said
- 5 received first zooming specification; and
- 6 repeating said displaying for the remaining ones of said first regions in an
- 7 expanded manner.
- 1 14. (Original) The method of claim 13, wherein the method further comprises
- 2 receiving a second zooming specification comprising one or more additional
- 3 ones of said polynary string constituting symbols;
- 4 excluding a second subset of said remaining ones of said first regions based
- 5 at least in part on said received second zooming specification; and
- 6 repeating said displaying for the remaining ones of said first regions.

- 1 15. (Original) The method of claim 14, wherein the method further comprises
- 2 receiving an unzoom specification;
- 3 restoring the remaining ones of said first regions to re-include said excluded
- 4 second subset of said first regions; and
- repeating said displaying for the remaining ones of said first regions.
- 1 16. (Original) The method of claim 13, wherein the method further comprises
- 2 receiving an unzoom specification;
- 3 restoring the remaining ones of said first regions to re-include said excluded
- 4 first subset of said first regions; and
- 5 repeating said displaying for said first regions.
- 1 17. (Original) The method of claim 1, wherein said associating comprises for
- 2 each of said first regions, associating a selected one of a plurality of symbols with
- 3 the region based at least in part on the determined graphing value of the region.
- 1 18. (Original) The method of claim 1, wherein said associating comprises for
- 2 each of said first regions, associating a selected one of a plurality of color attributes
- 3 with the region based at least in part on the determined graphing value of the region.
- 1 19. (Cancelled)
- 1 20. (Original) The method of claim 1, wherein said associating comprises for
- 2 each of said first regions, associating a selected blending of a plurality of colors with
- 3 the region based at least in part on contributions to the determined graphing value
- 4 of the region.

- (Original) The method of claim 1, wherein said first regions correspond to all 21. 1
- constituting regions of the first recursively partitioned/nested geometric structure, 2
- said first normalized multi-dimensional data are values of independent variables of a 3
- function, and said first graphing values are corresponding values of a dependent 4
- variable of the function. 5
- (Original) The method of claim 1, wherein the method further comprises 1 22.
- identifying a second plurality of regions within a second recursively 2
- partitioned/nested geometric structure that correspond to a second plurality of 3
- normalized multi-dimensional data of a second normalized multi-dimensional data 4
- space, the second recursively partitioned/nested geometric structure being 5
- corresponding to the second normalized multi-dimensional data space; 6
- determining corresponding second graphing values for said second 7
- corresponding regions within said second recursively partitioned/nested geometric 8
- structure determined for said second normalized multi-dimensional data of said 9
- second normalized multi-dimensional data space; 10
- associating corresponding second visual attributes with said second 11
- corresponding regions within said second recursively partitioned/nested geometric 12
- structure, based at least in part on corresponding ones of said determined second 13
- graphing values; and 14
- displaying said second recursively partitioned/nested geometric structure, 15
- visually differentiating said second corresponding regions based at least in part on 16
- corresponding ones of said associated second visual attributes. 17
 - (Original) The method of claim 22, wherein said first and second recursively 23. 1
 - partitioned/nested geometric structures are displayed in a manner such that both 2
 - recursively partitioned/nested geometric structures are visible concurrently. 3

- (Original) The method of claim 23, wherein each of said first and second 24. 1
- normalized multi-dimensional data of said first and second normalized multi-2
- dimensional data spaces comprises a polynary string having a plurality of symbols, 3
- encoding a plurality of relative coordinate values, the method further comprises 4
- receiving a first zooming specification comprising one or more of said 5
- polynary string constituting symbols; 6
- excluding a first subset of said first regions based at least in part on said 7
- received first zooming specification; 8
- excluding a second subset of said second regions based at least part on the 9
- removed ones of said first regions; and 10
- repeating said displaying for the remaining ones of said first and second 11
- 12 regions.
 - (Original) The method of claim 22, wherein said first and second normalized 25. 1
- multi-dimensional data are values of first and second input variables. 2
- (Original) The method of claim 22, wherein said first normalized multi-1 26.
- dimensional data are values of input variables, and said second normalized multi-2
- dimensional data are values of corresponding output variables. 3
- (Original) The method of claim 1, wherein the method further comprises 1 27.
- computing a location for a centroid for each of a plurality primitive elements of the 2
- geometric structure. 3
- (Original) The method of claim 27, wherein coordinates $(x_p,\,y_p)$ of the location 1 28.
- of each centroid is computed as follows: 2

3
$$Xp = Xc + R * \sum_{k=1}^{K} V(N,k) * C(N,m[Lk])$$

4
$$Y_p = Y_c + R * \sum_{k=1}^{K} V(N,k) * S(N,m[Lk])$$

- 5 where:
- 6 (X_c, Y_c) are coordinate values of the geometric structure's centroid;
- R is a radius extending from the geometric structure's centroid to an
- 8 outermost vertex of the geometric structure;
- 9 V(N, k) is $w^{*}(1 w)^{**}(k 1)$ where $w = 1/(1 + \sin(\pi/N))$;
- 10 m[Lk] is outer vertex number (1, 2, ..., N) assigned to the kth symbol
- appearing in a corresponding polynary string;
- 12 $C(N, m[L_k]) = cosine(a^* \pi)$; and
- 13 $S(N, m[L_k]) = sine(a^* \pi) [where a = (5^*N 4^*m[L_k])/(2^*N)].$
 - 1 29. (Original) The method of claim 28, wherein the K values of V(N, k) are
 - 2 computed once responsive to a specification of N.
 - 1 30. (Original) The method of claim 28, wherein at least the N values of C(N,
 - 2 m[Lk]) or the N values of S(N, m[Lk]) are computed once responsive to a
 - 3 specification of N.
 - 1 31. (Withdrawn) A processor implemented data processing method for
 - 2 generating a polynary string representation for an entity defined by n relative
 - 3 coordinate values, n being an integer, comprising:
 - 4 associating n symbolic representations with said n relative coordinate values;
 - 5 and

- 6 selecting the symbolic representation corresponding to the highest relative
- 7 coordinate value as the first constituting member of the polynary string
- 8 representation.
- 1 32. (Withdrawn) The method of claim 31, wherein the method further comprises
- 2 computing a constant value (F) by dividing (n 1) by n; and
- 3 computing a variable value (G) by subtracting F from 1;
- subtracting G from the current highest relative coordinate value; and
- 5 selecting the symbolic representation corresponding to the current highest
- 6 relative coordinate value as the next constituting member of the polynary string
- 7 representation.
- 1 33. (Withdrawn) The method of claim 32, wherein the method further comprises
- 2 multiplying the current value of G by F;
- 3 subtracting G from the current highest relative coordinate value; and
- 4 selecting the symbolic representation corresponding to the current highest
- 5 relative coordinate value as the next constituting member of the polynary string
- 6 representation.
- 1 34. (Withdrawn) The method of claim 33, wherein the method further comprises
- 2 repeating said multiply, subtracting and selecting operations set forth in claim 29.
- 1 35. (Withdrawn) The method of claim 31, wherein said symbolic representation
- 2 comprises a letter.
- 1 36. (Withdrawn) The method of claim 31, wherein said symbolic representation
- 2 comprises a special character.

7	37. (Withdiawn) A processor implemented data processing method for				
2	generating a relative coordinate value for an constituting variable of an entity, the				
3	entity being represented by a polynary string representation having a plurality of				
4	symbolic members representing the constituting variables, the method comprising:				
5	determining appearance positions of appearance instances of the symbolic				
6	members in said polynary string representation;				
7	summing positional values corresponding to the appearance instances of the				
8	symbolic members in said polynary string representation; and				
9	adding the sum to an average residual relative coordinate value.				
1	38. (Withdrawn) The method of claim 37, wherein				
2	each positional value equals to (1 – F) x F**(k – 1), and				
3	the average residual relative coordinate value equals $(1 - F) \times F^{**}K$,				
4	where F equals (n – 1)/n,				
5	n equals the number of coordinate values,				
6	k denotes a position in the polynary string representation; and				
7	K equals the length of the polynary string.				
1	39. (Currently Amended) An apparatus comprising:				
2	storage medium having stored therein programming instructions designed to				
3	enable the apparatus to				
4	identify a first plurality of regions within a first recursively				
5	partitioned/nested geometric structure that correspond to a first				
6	plurality of normalized multi-dimensional data of a first normalized				
7	multi-dimensional data space, the first recursively partitioned/nested				

8.	geometric structure being corresponding to the first normalized multi-
9	dimensional data space,
10	determine corresponding first graphing values for said first corresponding
11	regions within said first recursively partitioned/nested geometric
12	structure determined for said first normalized multi-dimensional data of
13	said first normalized multi-dimensional data space;
14	associate corresponding first visual attributes with said first corresponding
15	regions within said first recursively partitioned/nested geometric
16	structure, based at least in part on corresponding ones of said
17	determined first graphing values, including associating for each of said
18	first regions a selected one of a plurality of colored geometric
19	primitives with the region based at least in part on the determined
20	graphing value of the region, and
21	display said first recursively partitioned/nested geometric structure,
22	visually differentiating said first corresponding regions based at least in
23	part on corresponding ones of said associated first visual attributes;
24	and
25	at least one processor coupled to the storage medium to execute the
26	programming instructions.

(Original) The apparatus of claim 39, wherein each of said first normalized 1 40. multi-dimensional data of said first normalized multi-dimensional data space 2 comprises a plurality of relative coordinate values, and the programming instructions 3 are further designed to enable the apparatus to construct a polynary string to 4 represent each of said first normalized multi-dimensional data and its corresponding 5 one of said first regions within said first recursively partitioned/nested geometric 6

structure in accordance with the relative coordinate values.

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- 1 41. (Original) The apparatus of claim 40, wherein said programming instructions
- 2 are designed to enable the apparatus to perform said constructing of a polynary
- 3 string by selecting a symbol as the next symbolic member of the polynary string
- 4 based on which of the relative coordinate values is the current highest relative
- 5 coordinate value.
- 1 42. (Original) The apparatus of claim 41, wherein said programming instructions
- 2 are further designed to enable the apparatus to perform said constructing of a
- 3 polynary string by reducing the highest relative coordinate value in by an amount
- 4 (G), upon each selection, and reducing the amount (G) after each reduction.
- 1 43. (Original) The apparatus of claim 42, wherein said programming instructions
- 2 are designed to enable the apparatus to set the amount (G) initially to 1 F, and
- 3 thereafter reduced each time by $G^*(1 F)$, where F equals (n 1)/n, and n equals
- 4 the number of relative coordinate values.
- 1 44. (Original) The apparatus of claim 40, wherein said programming instructions
- 2 are designed to enable the apparatus to perform said determining by determining
- 3 frequencies of occurrence of the various polynary strings of said first normalized
- 4 multi-dimensional data, and assigning the determined frequencies of occurrence to
- 5 the corresponding first regions within the first recursively partitioned/nested
- 6 geometric structure as the determined first graphing values of the corresponding first
- 7 regions.
- 1 45. (Original) The apparatus of claim 39, wherein said programming instructions
- 2 are designed to enable the apparatus to perform said determining by assigning first

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- output values corresponding to the first normalized multi-dimensional data as the 3
- determined first graphing values of the corresponding first regions within the first 4
- recursively partitioned/nested geometric structure. 5
- (Original) The apparatus of claim 45, wherein said programming instructions 46. 1
- are further designed to enable the apparatus to perform said determining by 2
- computing said first output values. 3
- (Original) The apparatus of claim 46, wherein each of said first normalized 47. 1
- multi-dimensional data of said first normalized multi-dimensional data space 2
- comprises a polynary string having a plurality of symbols, encoding a plurality of 3
- relative coordinate values, and said programming instructions are designed to 4
- enable the apparatus to perform said computing by 5
- summing one or more appearance values corresponding to one or more 6
- appearances of the particular symbol in a polynary string, and adding the sum to an 7
- average residual relative coordinate value, and 8
- repeating said summing and adding for each constituting symbols of the 9
- 10 polynary string.
- (Original) The apparatus of claim 47, wherein each appearance value 48. 1
- corresponding to an appearance of a particular symbol is dependent on the position 2
- of the particular appearance of the particular symbol in the polynary string. 3
- (Original) The apparatus of claim 48, wherein each appearance value 49. 1
- corresponding to an appearance of a particular symbol is equal to a positional value 2
- associated with the position of the particular appearance in the polynary string. 3

(Original) The apparatus of claim 49, wherein 50. 1 each positional value equals to $(1 - F) \times F^{**}(k - 1)$, and 2 the average residual relative coordinate value equals (1 - F) x F**K, 3 where F equals (n-1)/n, 4 k denotes a position in a polynary string, 5 n equals the number of relative coordinate values, and 6 K equals the length of the polynary string. 7 (Original) The apparatus of claim 40, wherein said programming instructions 1 51. are further designed to enable the apparatus to 2 receive a first zooming specification comprising one or more of said polynary 3 string constituting symbols; 4 exclude a first subset of said first regions based at least in part on said 5 received first zooming specification; and 6 repeat said displaying for the remaining ones of said first regions in an 7 8 expanded manner. (Original) The apparatus of claim 51, wherein said programming instructions 52. 1 are further designed to enable the apparatus to 2 receive a second zooming specification comprising one or more additional 3 ones of said polynary string constituting symbols; 4 exclude a second subset of said remaining ones of said first regions based at 5 least in part on said received second zooming specification; and 6 repeat said displaying for the remaining ones of said first regions. 7 (Original) The apparatus of claim 52, wherein said programming instructions 1 53.

are designed to enable the apparatus to

2

- 3 receive an unzoom specification;
- restore the remaining ones of said first regions to re-include said excluded 4
- second subset of said first regions; and 5
- repeat said displaying for the remaining ones of said first regions. 6
- (Original) The apparatus of claim 51, wherein said programming instructions 1 54.
- are further designed to enable the apparatus to 2
- receive an unzoom specification; 3
- restore the remaining ones of said first regions to re-include said excluded 4
- first subset of said first regions; and 5
- repeat said displaying for said first regions. 6
- (Original) The apparatus of claim 39, wherein said programming instructions 1 55.
- are designed to enable the apparatus to perform said associating by associating, for 2 .
- each of said first regions, a selected one of a plurality of symbols with the region 3
- based at least in part on the determined graphing value of the region. 4
- (Original) The apparatus of claim 39, wherein said programming instructions 1 56.
- are designed to enable the apparatus to perform said associating by associating, for 2
- each of said first regions, a selected one of a plurality of color attributes with the 3
- region based at least in part on the determined graphing value of the region. 4
- (Cancelled) 1 57.
- (Original) The apparatus of claim 39, wherein said programming instructions 1 58.
- are designed to enable the apparatus to perform said associating by associating, for 2
- each of said first regions, a selected blending of a plurality of colors with the region 3

- 4 based at least in part on contributions to the determined graphing value of the
- 5 region.
- 1 59. (Original) The apparatus of claim 39, wherein said first regions correspond to
- 2 all constituting regions of the first recursively partitioned/nested geometric structure,
- 3 said first normalized multi-dimensional data are values of independent variables of a
- 4 function, and said first graphing values are corresponding values of a dependent
- 5 variable of the function.
- 1 60. (Original) The apparatus of claim 39, wherein said programming instructions
- 2 are further designed to enable the apparatus to
- 3 identify a second plurality of regions within a second recursively
- 4 partitioned/nested geometric structure that correspond to a second plurality of
- 5 normalized multi-dimensional data of a second normalized multi-dimensional data
- 6 space, the second recursively partitioned/nested geometric structure being
- 7 corresponding to the second normalized multi-dimensional data space;
- 8 determine corresponding second graphing values for said second
- 9 corresponding regions within said second recursively partitioned/nested geometric
- 10 structure determined for said second normalized multi-dimensional data of said
- 11 second normalized multi-dimensional data space;
- 12 associate corresponding second visual attributes with said second
- 13 corresponding regions within said second recursively partitioned/nested geometric
- 14 structure, based at least in part on corresponding ones of said determined second
- 15 graphing values; and
- 16 display said second recursively partitioned/nested geometric structure,
- 17 visually differentiating said second corresponding regions based at least in part on
- 18 corresponding ones of said associated second visual attributes.

- (Original) The apparatus of claim 60, wherein said first and second 1 61.
- recursively partitioned/nested geometric structures are displayed in a manner such 2
- that both recursively partitioned/nested geometric structures are visible concurrently. 3
- (Original) The apparatus of claim 61, wherein each of said first and second 62. 1
- normalized multi-dimensional data of said first and second normalized multi-2
- dimensional data spaces comprises a polynary string having a plurality of symbols, 3
- encoding a plurality of relative coordinate values, said programming instructions are 4
- further designed to enable the apparatus to 5
- receive a first zooming specification comprising one or more of said polynary 6
- string constituting symbols; 7
- exclude a first subset of said first regions based at least in part on said 8
- received first zooming specification; 9
- exclude a second subset of said second regions based at least part on the 10
- removed ones of said first regions; and 11
- repeat said displaying for the remaining ones of said first and second regions. 12
 - (Original) The apparatus of claim 60, wherein said first and second 1 63.
- normalized multi-dimensional data are values of first and second input variables. 2
- (Original) The apparatus of claim 60, wherein said first normalized multi-1 64.
- dimensional data are values of input variables, and said second normalized multi-2
- dimensional data are values of corresponding output variables. 3
- (Original) The apparatus of claim 39, wherein said apparatus is a selected 1 65.
- one of a palm sized processor based device, a notebook computer, a desktop 2

- 4 collection of coupled servers.
- 1 66. (Previously presented) The apparatus of claim 39, wherein said programming

computer, a set-top box, a single processor server, a multi-processor server, and a

- 2 instructions are further designed to compute a location for a centroid for each of a
- 3 plurality of primitive elements of the geometric structure.
- 1 67. (Original) The apparatus of claim 66, wherein said programming instructions
- 2 are designed to compute coordinates (xp, yp) of the location of each centroid as
- 3 follows:

3

4
$$X_p = X_c + R * \sum_{k=1}^{K} V(N,k) * C(N,m[Lk])$$

5
$$Y_p = Y_c + R * \sum_{k=1}^{K} V(N,k) * S(N,m[Lk])$$

- 6 where:
- 7 (X_c, Y_c) are coordinate values of the geometric structure's centroid;
- R is a radius extending from the geometric structure's centroid to an
- 9 outermost vertex of the geometric structure;
- 10 V(N, k) is $w^*(1-w)^{**}(k-1)$ where $w = 1/(1+\sin(\pi/N))$;
- 11 m[Lk] is outer vertex number (1, 2, ..., N) assigned to the kth symbol
- 12 appearing in a corresponding polynary string;
- 13 $C(N, m[L_k]) = cosine(a^* \pi)$; and
- 14 $S(N, m[L_k]) = sine(a^* \pi)$ [where $a = (5^*N 4^*m[L_k])/(2^*N)$].

					_		
	~~	/O=i=i==1)]	The apparatus	of alaim 67	umoroin caid	programming	instructions
า .	68.	(Original)	The apparatus	or Gaim or,	Wilerent Sala	programming	11130 0000110

- are designed to compute the K values of V(N, k) once responsive to a specification 2
- 3 of N.

٠ :

- (Original) The method of claim 67, wherein said programming instructions are 69. 1
- designed to compute at least the N values of C(N, m[Lk]) or the N values of S(N, 2
- m[Lk]) once responsive to a specification of N. 3
- (Withdrawn) An apparatus comprising 1 70.
- storage medium having stored therein programming instructions designed to 2
- 3 enable the apparatus to
- associate n symbolic representations with said n relative coordinate 4
- values, and 5
- select the symbolic representation corresponding to the highest 6
- relative coordinate value as the first constituting member of the 7
- polynary string representation; and 8
- at least one processor coupled to the storage medium to execute the 9
- programming instructions. 10
- (Withdrawn) The apparatus of claim 70, wherein the programming 71. 1
- instructions further enable the apparatus to 2
- compute a constant value (F) by dividing (n-1) by n; and 3 .
- compute a variable value (G) by subtracting F from 1; 4
- subtract G from the current highest relative coordinate value; and 5
- select the symbolic representation corresponding to the current highest 6
- relative coordinate value as the next constituting member of the polynary string 7
- 8 representation.

- (Withdrawn) The apparatus of claim 71, wherein the programming 1 72.
- instructions further enable the apparatus to 2
- multiply the current value of G by F; 3
- subtract G from the current highest relative coordinate value; and 4
- select the symbolic representation corresponding to the current highest 5
- relative coordinate value as the next constituting member of the polynary string 6
- 7 representation.
- (Withdrawn) The apparatus of claim 72, wherein the programming 73. 1
- instructions further enable the apparatus to repeat said multiply, subtracting and 2
- selecting operations set forth in claim 64. 3
- (Withdrawn) The apparatus of claim 70, wherein said symbolic representation 1 74.
- 2 comprises a letter.
- (Withdrawn) The apparatus of claim 70, wherein said symbolic representation 1 75..
- comprises a special character. 2
- (Withdrawn) The apparatus of claim 70, wherein said apparatus is a selected 76. 1
- one of a palm sized processor based device, a notebook computer, a desktop 2
- computer, a set-top box, a single processor server, a multi-processor server, and a 3
- collection of coupled servers. 4
- (Withdrawn) An apparatus comprising: 1 77.
- storage medium having stored therein a plurality of programming instructions 2
- designed to enable the apparatus to 3

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4	78	(Withdrawn) The apparatus of claim 77, wherein
12	prog	ramming instructions.
11		at least one processor coupled to the storage medium to execute the
10	:	add the sum to an average residual relative coordinate value; and
9		symbolic members in said polynary string representation, and
8	•	sum positional values corresponding to the appearance instances of the
7	. :	corresponding to the constituting variables,
6		number of constituting variables, the symbolic members being
5		members of a polynary string representation of an entity having a
4 .		determine appearance positions of appearance instances of symbolic

- 1 78. (Withdrawn) The apparatus of claim 77, wherein
 2 each positional value equals to (1 F) x F**(k 1); and
 3 the average residual relative coordinate value equals (1 F) x F**K,
 4 where F equals (n 1)/n,
 5 n equals the number of coordinate values,
 6 k denotes a position in the polynary string representation; and
 7 K denotes the length of the polynary string.
- 1 79. (Withdrawn) The apparatus of claim 77, wherein said apparatus is a selected one of a palm sized processor based device, a notebook computer, a desktop computer, a set-top box, a single processor server, a multi-processor server, and a collection of coupled servers.

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